

A plasma processing method that makes it possible to remove a photoresist film and fence portion while maintaining a specific shape of the opening is provided. After a wafer W is placed on a lower electrode 106 provided inside a processing chamber 102 of an ashing apparatus 100, power with its frequency set at 60 MHz and its level set at 1 kW and power with its frequency set at 2 MHz and its level set at 250 W are respectively applied to an upper electrode 122 and the lower electrode 106. A processing gas induced into the processing chamber 102 is raised to plasma, a photoresist film 208 at the wafer W is ashed and, at the same time, fence portion 214 formed around the opening of a via hole 210 during the etching process is removed. The level of the power applied to the lower electrode 106 is set equal to or lower than 10 W before the photoresist film 208 is completely removed. As a result, the energy level of the ions induced into the wafer W becomes reduced, so that the photoresist film 208 is ashed without grinding shoulders 210a and 212a of the via hole 210 and groove 212 at the SiO₂ film.